APHA guidelines as early as 1965.[5] The novelty of the work lies in the experimental design and regression modeling that were used in the study, in addition to precise definition of what constituted the illness under scrutiny. As such, the research represents a rigorous new paradigm for future studies.

Although Fleisher and colleagues' current paper contains significant improvements in experimental design and data analysis over Stevenson's seminal work, and does indeed provide more precise estimates of risk, further study is needed to address causation. The dose–response relationship that was identified supports a hypothesis of directly causal association—one that would be relatively straightforward to test in future studies. Interestingly, even though analyses were appropriately stratified and examined for confounding variables on the "human" end of the study, no such detailed examination of the bacteriological variables was presented. What was the magnitude of error in the estimation of bacterial counts during the various sampling times over the span of the study? Were there differences in surf or current intensity, tides, temperature, silt, or algae that might influence the quantum of infection delivered to bathers during their immersion? More research should be focused on the dynamics of these environmental variables and on how such variability may affect the routine public health sampling of recreational waters.

The causal relationships that serve as the foundation for Fleisher and colleagues' demonstrated statistical associations appear biologically complex. For example, an association between coliform and streptococcal densities might be expected because they are both indicators of fecal contamination, and this relationship should be reflected in the thresholds of effect. If the risk of acquiring acute febrile respiratory illness is related to increasing streptococcal density, why was no such association found for coliforms? One answer might be that the fecal streptococci/fecal coliform ratio may vary by distance from the sampling point and sewage source and by the nature of the contamination. Such between-site variability in indicator ratios may explain some of the various associations described, in that co-occurring pathogens might vary by source (neither indicator organism was implicated as a causative agent for any of the illnesses under scrutiny).

The crude rates of illness that Fleisher et al. found among bathers barely differed from those found for nonbathers (3% of 668 nonbathers vs 5% of 548). The finding that individual risk increased with exposure (odds ratio of 2.65, with a broad 95% confidence interval [1.19, 5.48]) raises the issue of whether, for public health policy purposes, risk should be measured by an averaging procedure for a population or based on actual individual risk to varying levels of exposure.

Duration of exposure was not associated with illness, which might indicate that the causative agents were not necessarily related to contaminated water. The quantum of infection would logically depend on duration of exposure. Alternatively, recreational water–related infection might be due to fomites that, when ingested or taken in in other ways, would provide an adequate infectious inoculum. In this scenario, duration of exposure would not necessarily be associated with risk. Interestingly, Stevenson's 1953 paper determined that even bathing in uncontaminated water seemed to increase the risk of acquiring an infection. Perhaps exposure of the nasal passages to water might dilute microorganism-trapping mucus. Future studies should include another control cohort that would be exposed to waters with no sewage contamination.

Fleisher and colleagues' analyses of a uniquely designed experiment represent a vast methodological improvement over previous studies. Once completed, these reports may eventually achieve a similar degree of importance as Stevenson's work. The advances of the current paper focus our attention on the complex nature of the biology of the infectious process in recreational water–associated illness and on the difficulty of probing causation in a dynamic microbiological environment. □

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References

1. Stevenson AJ. Studies of bathing water quality and health. *Am J Public Health.* 1953;43:529–538.
2. Fleisher JM, Kay D, Salmon RL, Jones F, Wyer MD, Godfree AF. Marine waters contaminated with domestic sewage: nonenteric illnesses associated with bather exposure in the United Kingdom. *Am J Public Health.* 1996;86:1228–1234.
3. Fleisher JM, Jones F, Kay D, et al. Water and nonwater related risk factors for gastroenteritis among bathers exposed to sewage-contaminated marine waters. *Int J Epidemiol.* 1993;22:698–708.
4. Kay D, Fleisher JM, Salmon RL, et al. Predicting likelihood of gastroenteritis from sea bathing: results from randomised exposure. *Lancet.* 1994;344:905–909.
5. American Public Health Association, American Water Works Association, Water Pollution Control Federation. *Standard Methods for the Examination of Water and Wastewater.* 12th ed. New York, NY: American Public Health Association; 1965.

Topics for Our Times: Public Health on the Line—Abortion and Beyond

We have become accustomed to the continual efforts to curtail the use of abortion in the United States. Local laws bog down the informed consent process and result in delays and obstacles. We have witnessed harassment, the physical assault of those seeking abortion, and even the murder of those providing it. Antiabortion riders are steadily tacked on to congressional bills. The public debate centers on the obvious: the legal, ethical, and political arguments over the control of reproduction.

An additional, important by-product of these antiabortion activities is the denigration of and interference with the principles, practices, and technical content of public health and clinical medicine. Throughout the past 2 decades, state legislation has curtailed access to abortion by limiting public funding and facilities and by requiring mandatory waiting periods, specified counseling provisions, and parental consent. These measures infringed on medical autonomy, as well as restricting access for those at highest risk: adolescents and low-income women.[1] Recent antiabortion activities have incorporated new tactics. I examine them here in the light of their impact on such fundamental public health concerns as research, access, and equity.

The study of patterns of disease and health-related behaviors is fundamental to public health. Caution and rigor are essential to the interpretation and application of such epidemiological data. Some legislative efforts to curtail access to abortion have flagrantly violated this

principle. One example is the use of preliminary and inconsistent epidemiological data regarding abortion and breast cancer risk to advance a political agenda. A recent wave of state bills require that informed consent documents for abortion "instruct" women that terminating a pregnancy will increase their risk of breast cancer. Legislators in 10 states have introduced "Women's Right to Know" bills that require women seeking abortions to be told of a "potential cancer risk," or limit a minor's ability to consent to "a substantial cancer risk," or require abortion clinics to post warning signs about breast cancer.[2] A group called "Christ's Bride Ministries" has launched campaigns on the transit systems of Washington, DC, Baltimore, Philadelphia, and Hartford and New Britain, Conn, with advertisements stating that "Women who choose abortion suffer more and deadlier breast cancer."[3] Both initiatives ignore statements from National Cancer Institute researchers and other authorities that any findings should be regarded as preliminary and inconclusive, because (1) study results were inconsistent, (2) an effect size, if real, would be very small, and (3) there were problems with the methodology of the studies (Philip R. Lee, MD, Department of Health and Human Services, letter to Lawrence Reuter, Washington Metropolitan Area Transit Authority, February 1996).[4,5]

A similar dismissal of epidemiological, public health, and clinical expertise underlies the recent flurry of legislative efforts to ban a specific abortion technique known as intact dilation and extraction (D & X), inflammatorily misnamed "partial birth abortion." On the rare occasions when late second-trimester termination is essential, D & X is the method of choice because it has been demonstrated to be the safest procedure.[6] In truth, of course, it is the use of any alternative procedure that increases maternal risk that should require rigorous justification. Although organized medicine only tepidly defended medical expertise and autonomy, President Clinton vetoed the Senate-amended prohibition adopted by the House (HR 1833), citing his concern for women's health.[7] Although the president's concern is certainly laudable and consonant with public health principles, he did not address the issue of congressional intrusion into the practice of medicine and public health. Despite the president's veto, similar bills have been introduced on the state level.[8]

In contrast, in Great Britain organized medicine responded much more cohesively and vigorously in opposition to a similar bill introduced there. Members of the British Medical Association and the Royal College of Obstetricians and Gynecologists objected on the grounds that such a prohibition would interfere with a physician's ability to act in the patient's best interest and rebuffed the attempt by Parliament to regulate the details of medical procedures. The bill was withdrawn.[9]

Here in the United States, Congress also has interfered with medical education. In the face of data demonstrating that the majority of US obstetrics/gynecology residents were not learning to perform abortions, the Accreditation Council for Graduate Medical Education stipulated last year that obstetrics/gynecology training programs had to ensure that their graduates were competent to perform this procedure.[10] A "conscience clause" permitted those with religious objections to opt out, although they would still be expected to learn to handle associated complications. Antiabortion representatives introduced bills intended to undercut the guidelines and to threaten the Accreditation Council's federal funding and status as accrediting agency.[11] Although the Accreditation Council, the American Medical Association, and the American College of Obstetricians and Gynecologists objected, none did so strenuously. All agreed on compromise language that vitiated the original intent of the guidelines. This weakened version became law when President Clinton signed the compromise budget in late April.

Public health is distinguished from clinical medicine in part by its focus on the health of populations. Data from the United States and around the world consistently demonstrate that when abortion is legal and accessible, both maternal and infant mortality rates decline. The reduction in maternal mortality results from the replacement of unsafe abortion procedures under unregulated circumstances by safe, state-of-the-art abortion procedures performed under regulated conditions. The reduction in infant mortality results from the prevention of unwanted pregnancies and a decrease in births to women at high risk of adverse outcomes.[12] Moreover, in the United States legalized abortion significantly and uniquely reduced the gap in abortion-related mortality between Blacks and Whites.[6] High Black–White mortality ratios, which most analyses have failed to explain and most interventions failed to redress, persist across many health conditions. Yet here we have a success story, one that is scarcely noticed or understood.

A host of recently introduced federal bills would deny access to abortion to specific populations. The Commerce–Justice Appropriations Bill, which was vetoed by the president, would have denied access to abortion among federal prisoners. However, the president did sign both the Treasury–Postal Service Appropriations Bill, which prohibits insurance coverage of abortion for federal employees, and the Department of Defense Appropriations Bill, which does not allow military personnel or their dependents to obtain abortions in military facilities overseas even if they pay for the procedure themselves.[13]

An overlapping area of public health concern is health care financing and structure. The organization of medical and public health services in the United States is clearly in the midst of dramatic upheaval. Some of these developments may further limit access to abortion. As managed care sweeps the nation, hospitals are affiliating, merging, and forming relationships with other provider institutions. Religiously affiliated hospitals that adhere to doctrinal prohibitions against a range of reproductive health services (abortion, sterilization, assisted reproduction, contraception, and emergency contraception even for rape victims) have joined with institutions that have traditionally provided such services. A review of 57 such arrangements in 1992 between Catholic and non-Catholic institutions revealed that 10 (18%) resulted in the elimination of reproductive health services, 8 (14%) moved reproductive health into legally separate clinics, and the remaining 39 (68%) did not provide information on services offered.[14] By 1994, there were more than 100 such mergers, affiliations, and joint ventures between Catholic and non-Catholic hospitals and managed care networks.[15] As a result of mergers, 46 municipalities are served exclusively by Catholic hospitals. A recent survey indicated that only 27% of American women were aware that belonging to a Catholic health plan would restrict their access to reproductive health services.[14] Once again, the burden of loss of service falls most heavily on low-income women and women in under-served areas. Legal advocates and community organizers have tried a variety of strategies to maintain the provision of reproductive health services.

These include local publicity, physician refusal to join the new ventures, opposition to the certificate of need, and the negotiation of compromises, such as the creation of separate legal entities, referral to other providers, and the establishment of funds to enable low-income women to get services elsewhere (Eve Gartner, JD, Center for Reproductive Law & Policy, letter to author, May 7, 1996).[16]

The development of medical abortifacients augurs the possibility of significant change in the key public health parameters of safety and access to care. Both mifepristone (RU 486) and methotrexate successfully terminate pregnancies (96%) within 56 to 63 days of the last menstrual period and can be used earlier in gestation than conventional suction curettage.[17,18] This may contribute to moving the average gestational age at abortion earlier within the first trimester, which is the safest time period (52% of abortions in the United States currently occur within 63 days and 88% within 84).[19] Mifepristone may actually be very useful as an emergency contraceptive agent, as it appears to have a wider window of efficacy and fewer side effects than the hormonal agents currently used for that purpose.

The promise of improved access derives from the privacy with which these medications can be administered. This service potentially could be provided outside of an identified—and thus vulnerable—abortion clinic and by a wider variety of providers, so long as they are competent to assess gestational age and have back-up arrangements for surgical termination. Antiabortion activists have concentrated on trying to prevent the acceptance of mifepristone in this country. Since methotrexate is already available, opponents have launched disinformation campaigns—like those raising the specter of breast cancer—and have already described methotrexate as a "chemical abortion" being used on "women guinea pigs."[20]

Public health and medical practitioners have an ethical obligation to advance the community's and the patient's best interests. Yet governmental restrictions on clinical practice and training, on the design and scope of services, and on the use of research data force these professionals to impose health risks on women. The dismissal of public health and clinical expertise described here has implications that extend beyond abortion. Already, bills have been introduced to prohibit research on sexuality and to curtail child protective activities and adolescents' ability to seek health care independently.[21]

It is therefore critical that public health professionals provide a vigorous and organized public health defense against the attacks on abortion. We need to do so, not only for the sake of reproductive health, but also to assert our own professional autonomy and integrity. This can be achieved by insisting that our voices, our expertise, and our knowledge of health consequences be included in the debate. We can offer this perspective to the media and to local and national policymakers. We can also ask other professional organizations to join us in this defense.

The physicians in Britain demonstrated a model of an organized and rapid response. The American Public Health Association has consistently passed supportive resolutions and served as amicus in legal defenses of abortion—a role that should be continued and expanded. Public health professionals have much to offer in debates about reproductive health, and much is at stake. □

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References

1. Council on Scientific Affairs, American Medical Association. Induced termination of pregnancy before and after *Roe v Wade*. *JAMA*. 1992;268:3231–3239.
2. Gammon M, Bertin JE, Terry MB. Abortion and the risk of breast cancer: is there a believable association? *JAMA*. 1996;275: 321–322.
3. National Abortion Federation, Access Initiative. *Christ's Bride Ministries and the American Rights Coalition*. Washington, DC: National Abortion Federation; February 1996.
4. Rosenberg L. Induced abortion and breast cancer: more scientific data are needed. *J Natl Cancer Inst*. 1994;86:1569–1570.
5. *National Cancer Institute Fact Sheet: Risk of Breast Cancer Associated with Abortion*. Washington, DC: National Cancer Institute; February 13, 1996.
6. Atrash HK, Mackay HT, Binkin NJ, Hogue CJR. Legal abortion mortality in the United States: 1972 to 1982. *Am J Obstet Gynecol*. 1987;156:858–861.
7. Center For Reproductive Law & Policy. President Clinton vetoes effort to ban specific abortion technique. *Reproductive Freedom News*. 1996;5(8):4.
8. Center for Reproductive Law & Policy. Legislative action. *Reproductive Freedom News*. 1996;5(9):8.
9. Center for Reproductive Law & Policy. Bill to ban specific abortion method rescinded in United Kingdom. *Reproductive Freedom News*. 1996;5(4):8.
10. Accreditation Council on Graduate Medical Education. *Revised Special Requirements for Obstetrics-Gynecology, Section III A.2.d-e, Family Planning and Abortion, February 14, 1995 (modified July 31, 1995)*. Washington, DC: CREOG, 1995.
11. Coats-Snowe Amendment to HR 3019. *Congressional Record*. March 19, 1996; 142(38):S2268.
12. Corman H, Grossman M. *Determinants of Neonatal Mortality Rates in the United States*. Cambridge, Mass: National Bureau of Economic Resources; 1984. NBEP working paper series no 1387.
13. Planned Parenthood Federation of America, Inc. Legislative update. *Planned Parenthood Today*. Spring 1996;4.
14. Lebel GG, Pierron WL. *Reproductive Health at Risk: A Report on Mergers and Affiliations in the Catholic Health Care System*. Washington, DC: Catholics for a Free Choice; 1995.
15. Lewin T. With rise in health unit mergers, Catholic standards face challenge. *New York Times*. March 8, 1995:B7.
16. American Civil Liberties Union. *Reproductive Rights Update: a Quarterly Report of Policy & Analysis*. Washington, DC: American Civil Liberties Union; October, 1995.
17. Hausknecht RU. Methotrexate and misoprostol to terminate early pregnancy. *N Engl J Med*. 1995;333:537–540.
18. El-Refaey H, Rajasekar D, Abdalla M, Calder L, Templeton A. Induction of abortion with mifepristone (RU 486) and oral or vaginal misoprostol. *N Engl J Med*. 1995;332:983–987.
19. Centers for Disease Control. Abortion surveillance—United States, 1991. *MMWR*. 1995;44(SS-2):23–53.
20. Caulfield B. Chemistry to kill: pro-life leaders decry use of cancer drug as abortion-at-home method. *Catholic New York*. April 4, 1996:1.
21. Parental Rights and Responsibilities Act of 1996, §984 (proposed).